

WHAT IS CLAIMED IS:

1. A regeneration device for a filter which traps a particulate matter contained in the exhaust gas of an engine, the device regenerating the filter by burning the particulate matter trapped in the filter by raising a temperature of the filter, the device comprising:

an exhaust gas temperature adjusting mechanism which adjusts a temperature of the exhaust gas;

an exhaust gas flow rate adjusting mechanism which adjusts a flow rate of the exhaust gas; and

a programmable controller programmed to:

determine whether or not a regeneration condition for the filter is satisfied;

raise the temperature of the exhaust gas to a first target exhaust gas temperature via the exhaust gas temperature adjusting mechanism when the regeneration condition is satisfied;

determine whether or not the engine is in a predetermined rapid deceleration state; and

control the temperature of the exhaust gas to a second target exhaust gas temperature lower than the first target exhaust gas temperature via the exhaust gas temperature adjusting mechanism while increasing the flow rate of the exhaust gas via the exhaust gas flow rate adjusting mechanism, when the engine is in the predetermined rapid deceleration state during regeneration.

2. The regeneration device as defined in Claim 1, wherein the controller is further programmed to control the exhaust gas flow rate adjusting mechanism to prevent

the flow rate of the exhaust gas from exceeding a predetermined upper limiting value.

3. The regeneration device as defined in Claim 1, wherein the exhaust gas temperature adjusting mechanism comprises a nozzle which injects fuel to the engine, and the controller is further programmed to control the temperature of the exhaust gas to the second target exhaust gas temperature by retarding an injection timing of the nozzle.

4. The regeneration device as defined in Claim 1, wherein the exhaust gas temperature adjusting mechanism comprises a nozzle which injects fuel into the engine, and the controller is further programmed to control the temperature of the exhaust gas to a second target exhaust gas temperature by performing a post-injection after an ordinary injection by the nozzle.

5. The regeneration device as defined in Claim 1, wherein the exhaust gas flow rate adjusting mechanism comprises an air intake throttle which adjusts an intake air flow rate of the engine.

6. The regeneration device as defined in Claim 1, wherein the engine comprises a turbocharger which turbocharges an intake air of the engine, the turbocharger comprising an exhaust gas turbine which rotates due to an energy of the exhaust gas and a compressor which turbocharges the intake air according to a rotation of the exhaust gas turbine, and the exhaust gas flow rate adjusting mechanism comprises a variable nozzle which varies an exhaust gas flow rate inside the

exhaust gas turbine.

7. The regeneration device as defined in Claim 1, wherein the engine comprises an exhaust gas recirculation passage which recirculates part of the exhaust gas into an intake air of the engine, and the exhaust gas flow rate adjusting mechanism comprises an exhaust gas recirculation valve which varies an exhaust gas flow rate of the exhaust gas recirculation passage.

8. The regeneration device as defined in Claim 1, wherein the regeneration device further comprises a sensor which detects a rotation speed of the engine and the controller is further programmed to determine whether or not the engine is in a predetermined rapid deceleration state according to a variation of the rotation speed of the engine.

9. A regeneration device for a filter which traps a particulate matter contained in the exhaust gas of an engine, the device regenerating the filter by burning the particulate matter trapped in the filter by raising a temperature of the filter, the device comprising:

means for adjusting a temperature of the exhaust gas;

means for adjusting a flow rate of the exhaust gas;

means for determining whether or not a regeneration condition for the filter is satisfied;

means for raising the temperature of the exhaust gas to a first target exhaust gas temperature via the exhaust gas temperature adjusting means when the regeneration condition is satisfied;

means for determining whether or not the engine is in a predetermined rapid deceleration state; and

means for controlling the temperature of the exhaust gas to a second target exhaust gas temperature lower than the first target exhaust gas temperature via the exhaust gas temperature adjusting means while increasing the flow rate of the exhaust gas via the exhaust gas flow rate adjusting means, when the engine is in the predetermined rapid deceleration state during regeneration.

10. A regeneration method for a filter which traps a particulate matter contained in the exhaust gas of an engine which is provided with an exhaust gas temperature adjusting mechanism which adjusts a temperature of the exhaust gas and an exhaust gas flow rate adjusting mechanism which adjusts a flow rate of the exhaust gas, the method regenerating the filter by burning the particulate matter trapped in the filter by raising a temperature of the filter, the method comprising:

determining whether or not a regeneration condition for the filter is satisfied;

raising the temperature of the exhaust gas to a first target exhaust gas temperature via the exhaust gas temperature adjusting mechanism when the regeneration condition is satisfied;

determining whether or not the engine is in a predetermined rapid deceleration state; and

controlling the temperature of the exhaust gas to a second target exhaust gas temperature lower than the first target exhaust gas temperature via the exhaust gas temperature adjusting mechanism while increasing the flow rate of the exhaust gas via the exhaust gas flow rate adjusting mechanism, when the engine is in the predetermined rapid deceleration state during regeneration.